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The Madroña.

THE forests of North America contain two broad-leaved evergreen trees unsurpassed by those of any other temperate region of the earth's surface. They are the Great Magnolia, the glory of our southern forests, the handsomest and perhaps the most esteemed of all garden decorations, and the Madroña of the humid coast-region of Oregon and California. This is the *Arbutus Menziesii*, and by far the largest and most beautiful of the trees of the small genus to which it belongs, and one of the most remarkable and interesting of all the trees of the northern Pacific forests.

The genus Arbutus is common to the Old World and the New. One species is widely distributed through southern Europe from Spain to the Caucasus, ascending the west coast of the continent to Ireland, where it abounds in the neighborhood of the Lakes of Killarney. This species, the *Arbutus Unedo* of botanists, the so-called Strawberry-tree, has been cultivated from time immemorial in gardens, which it decorates with its evergreen foliage and handsome white flowers. These appear late in the autumn simultaneously with the ripening of the brilliant red fruit of the previous year. A second species, *Arbutus Andrachne*, inhabits the Levant, and is sometimes seen, too, in the gardens of southern Europe. But the headquarters of the genus in the multiplication of the species is Mexico, where several little known and imperfectly defined forms exist. Two of these extend north of the boundary of the United States, one into Texas, where it occurs in the western part of the state in a few isolated stations, and the other into Arizona, where it grows high up on some of the mountain ranges in the extreme southern part of the territory. The home of the Madroña or of its ancestors was once, no doubt, among the Mexican mountains, where species which much resemble it still occur; but now it ranges far northward from the Santa Lucia Mountains, in southern California, to the islands which guard the coast of British Columbia. In favorable situations in forests influenced by the fogs and rains attracted to the coast from the surface of the Pacific, it attains a great size, shooting up to a height of more than 100 feet, and forming, when it grows surrounded by other trees, a tall, stout trunk three or four feet in diameter. Such a specimen appears in our illustration on page 515. It is made from a photograph of a forest-scene in California, sent by Mr. C. H. Shinn.

Often the Madroña appears on the dry foot-hills east of the outer coast range, where the forest is open, and the trees stand at a considerable distance apart, assuming a round-topped, spreading habit of growth. Developed under such conditions the Madroña looks at a little distance like some great Apple-tree. A surprising specimen of this sort—the greatest Madroña-tree in existence, perhaps—is growing near the reservoir in the town of San Rafael, across the bay from San Francisco. Great horizontal branches shoot out from the short and immensely thick trunk, and support a broad, symmetrical mass of foliage. This tree, which is certainly one of the marvels of arborescent growth, might well be taken for one of the great Live Oaks of California, which hardly surpass it in breadth of branch or in density of foliage. Its portrait will appear later in this journal, and will serve to illustrate one form of the Madroña which, south of the Bay of San Francisco, grows less vigorously than at the north, becoming smaller and smaller, until toward the southern limits of its distribution it is reduced to a low, stunted shrub.

The bark of the Madroña, like that of the other species of Arbutus and of the nearly related Manzanitas, which abound in California, is its most striking feature. It is very thin and smooth on the branches and young trunks through its separation into thin plates, and bright red-brown. On old trunks only, especially near their base, it becomes thick, furrowed and dark colored. In the species which is found in Arizona the mature bark is nearly white, or not unlike in color the bark of the White Oak, which it further resembles in the small, thin scales into which the surface separates. The bright red color of the branches of the Madroña heightens the effect of the ample ovate leaves, which are four or five inches long by half that breadth. They are thick and beautifully lustrous on the upper surface and pale on the lower. The flowers, which are shaped like those of some of our Blueberries and Andromedas, for Arbutus, like these, belongs to the Heath family, are white or greenish white, and are produced in large, terminal clusters or racemes. They unfold in early spring, and are followed by masses of orange-red berries, which brighten the trees for weeks in the late autumn.

The Madroña was naturally one of the first trees of our Pacific forests to attract the attention of botanists. Archibald Menzies, who is commemorated in its scientific name, the Scotch physician and naturalist, who sailed with Vancouver from 1790 to 1795, and who discovered and carried to England another remarkable tree, the Araucaria of Chili, first detected it, probably, near the mouth of the Columbia River. Thirty years later David Douglas recognized its value and sent seeds to England from the same region.

Economically the Madroña is a tree of considerable value, yielding a hard, straight, close-grained wood of a handsome pale red color, of real value in cabinet-making, provided sufficient care is taken in properly seasoning it. It is already largely consumed in the manufacture of charcoal, and the bark furnishes excellent tanning material. It is as an ornamental tree, however, that the Madroña first claims attention. It is not an easy tree to manage always, as the absence of fibrous roots makes any but nursery-grown specimens difficult to transplant. It is not hardy in the eastern states, and in Europe it will probably develop its greatest beauty only in such exceptionally warm and moist regions as Devonshire, the south of Ireland, the islands of the British Channel and some parts of western France. Specimens are occasionally seen in these favored localities, but we have no record of any large or exceptionally fine ones.

The Californians, who possess within their own territory the most wonderful as well as some of the most beautiful trees known to man, unfortunately neglect the material they have ready to their hands and ransack

the world for exotic trees with which to beautify their homes; and California valleys are fast becoming converted into groves of Eucalyptus and Acacias, while one looks in vain outside the rapidly disappearing forests for the native trees, which are world-wide wonders, and which ought to be the pride of every true Californian. There may be seen, to be sure, at every turn groves and specimens of the Monterey Pine, one of the ugliest of all its race, and of the beautiful Cypress of Monterey. These two trees are almost the most local and restricted of all American trees in natural distribution, but, strangely enough, they are easily propagated and transplanted and grow in cultivation at first with surprising rapidity, so that they are now scattered from Victoria to San Diego. But one looks almost in vain in the gardens of California for the other trees which give character, value and beauty to the forests of the state—the Oaks, the Pines, the Firs, the great Broad-leaved Maple, the Evergreen Laurel, the Manzanitas, and all the host of smaller trees and shrubs with curious foliage and beautiful flowers. But sooner or later the Californians will appreciate the beauty of their own forests and realize the value of the trees of California for the decoration of the gardens and parks of California, and then the Madroña will certainly attain the position it deserves among ornamental trees.

As we recall all the beauty of this marvelous tree seen in some sheltered forest glade of the north-west coast, we recall the words which the venerable Albert Kellogg, who loved the trees of his adopted state so well and studied them so faithfully through long years, once spoke of the Madroña; and to his question, "whether imagination, fiction or fancy can portray to itself a sylvan object more wonderful, more chaste or more charming," we can find no answer but one of negation.

The Proposed State Forest-Park.

RECENT articles in the New York *Tribune* regarding Adirondack matters mention the increase in the price of timber-lands as one of the results already produced by the extension of the railroads in the Adirondack region. This increase is a natural consequence, and has long been foreseen by intelligent observers of the course of things in the northern part of the state. This inevitable advance in prices will render more difficult the acquisition of lands for the proposed State Park or Forest Reservation, but it is an advance which is likely to continue for some time to come. It is not probable that the lands needed for a reservation for the protection of the sources of the great water-ways of the state can ever be acquired more cheaply than now, unless the state waits for more of the land to be burned over and completely desolated and destroyed; but this process would also destroy the rivers which the park is intended to preserve.

In his message to the Senate last winter the Governor recommended that the limits within which lands are to be retained by the state for the purposes of a state park should be settled and defined, and that they should include the wilder portion of the region covering the mountains and lakes at and around the head-waters of the several rivers which have their sources there, including the Hudson River. This recommendation was referred by the joint action of the two houses of the Legislature to the State Forest Commission, with instructions to make a thorough investigation of the possibilities of such an undertaking, and to report to the Legislature its conclusions thereon, and its recommendations as to the most effective methods to be employed to accomplish the end in view—the establishment of a State Park—together with any pertinent facts within the knowledge of the Commission relating to the general subject of forest-preservation or extension, and also to report the number of acres or square miles of land essential to fulfilling the requirements of a suitable reservation or park and the probable cost thereof.

This is the only plan of action, or suggestion of a plan, looking to the establishment of a state forest-park which has been presented to the public. The Commission has been making investigations during the summer, and in its forthcoming report it will, of course, present the main proposition in an affirmative form. That is, it will recommend the establishment of a state forest-park, so that all those who are in favor of that object can unite in support of the essential idea of the report, which is in every way desirable.

Other plans may be proposed after the Commission's report has been presented to the Legislature. Full discussion, not only in the Legislature but in the press of the state, will be necessary in order to develop the popular judgment regarding the enterprise. There appears to be an increase of public interest in the subject, and a more general impression than hitherto that something is likely to be done. It is to be hoped that this impression is well founded, and that some plan will be presented in support of which all who feel an intelligent interest in the destiny of the Adirondack forest-region can heartily unite. It is not likely that the expectation of the Governor, that "a state park from fifty to seventy miles square can be obtained by the State in that region at comparatively trifling expense," will be realized. The necessary cost of the land of such an area will not be trifling. But it will be less this year than in ten or twenty years from now, and for a possession so valuable as a forest-reservation of this extent around the sources of the principal rivers of the state the people of New York should be willing to pay a reasonable price.

The annual report of the General Commissioner of the Land Office of the United States has appeared. Judge Groff, the Commissioner, devotes considerable attention to the forest-problem. The means at the disposal of the Secretary of the Interior for protecting the forest-property of the nation is acknowledged to be entirely inadequate; and it is found that the most valuable timber on the public land is being exterminated unlawfully wherever forests exist. This is not a new discovery. The same thing has been stated more than once in previous reports from the same office; and it has been a notorious fact for years with all persons familiar with the actual condition of our western forests that, unless energetic measures are adopted for their protection, the practical extermination of these forests is only a matter of time. This subject has been brought to the attention of Congress year after year; bills looking for forest-preservation have been introduced again and again, and have met with the hearty approval of intelligent men in all parts of the country. Congressional indifference and local opposition from the forest-region, fostered by men directly interested in forest-destruction, have prevented the passage of any proper legislation for the protection of the nation's forests. This is a matter of urgent and commanding importance to the well-being of the whole country, and it cannot be safely postponed. Delay is danger, and danger which is real and impending, although not always readily understood by persons who are not familiar with the topographical and climatic conditions of the western part of this continent, which must become uninhabitable as soon as the forests which protect the valleys from the heights above them are swept away.

The use of the army of the United States to protect the national forest-domain until some better plan has been devised has been suggested by this journal, and, as yet, no better scheme has been proposed. It promises efficiency and has the advantage of economy. The press of the country and many thinking men sanction it with their approval.

"Great attention must also be given to the situation in which a building is to stand. A feudal castle in the middle of a wheat field—as at Machern, near Leipzig—is almost comic; as is an Egyptian pyramid in a gay Birch grove or a pastoral landscape, or a thatched hut surrounded by a French parterre.

"In the same way pointed Gothic architecture appears out of place when set among pointed Firs or Lombardy Poplars, while it is in place among round-headed Evergreens or Oaks and Beeches."—*From Pückler-Muskau's "Andeutungen über Landschafts-gärtnerei."*

Cape Cod Cranberries.

CRANBERRY-GROWING is unique among our horticultural industries. All a man's knowledge of gardening and fruit-growing in general is useless when he undertakes to grow this berry. He must lay aside his common notions of soils and tillage, and even discard the very tools which from boyhood he has considered essential to any kind of cultivation.

The Cranberry-growing sections of the country are few and scattered. The Cape Cod district is the pioneer ground of Cranberry culture, and it still undoubtedly holds first rank in general reputation. In provincial parlance the Cape Cod region includes all the peninsular portion of the state, beginning with the lower and eastward projection of Plymouth County. The Cranberry region extends from this eastern portion of Plymouth County eastward to the elbow of the peninsula, or, perhaps, even farther.

Upon one of the upper arms of Buzzard's Bay is the old town of Wareham. Here the tides flow over long marshes bordering the inlet, and rise along the little river which flows lazily in from the Plymouth woods. Here the sea-coast vegetation meets the thickets of Alder and Bayberry and Sweet Fern, with its groups of Wild Roses and Viburnums. And in sheltered ponds the Sweet Water Lily grows with Rushes and Pond Weeds in the most delightful abandon. In the warm and sandy glades two Dwarf Oaks grow in profusion, bearing their multitude of acorns upon bushes scarcely as high as one's head. The Dwarf Chestnut-Oak is often laden with its pretty fruits when only two or three feet high, and it is one of the prettiest shrubs in our eastern flora.

Driving northward over the winding and sandy roads into the town of Carver, where the largest Cranberry plantations are located, our journey lies in the Plymouth woods. And here the surprises begin! We see no fields of Corn and Grass, and snug New England gardens, and quaint old houses whose genealogies run into centuries; but we plunge into a wilderness!—not a second growth, half-civilized forest, but a primitive waste of sand and Pitch Pine and Oaks! The country has never been cleared, and it is not yet settled! And in its wilder portions deers are still hunted and lesser game is frequent! And only fifty miles away is the bustling Hub of the universe!

This Cape Cod region is but a part of the sandy waste which stretches southward and westward through Nantucket, along the north shore of the sound and through a large part of Long Island; and essentially the same formation is continued along the New Jersey seaboard. Similarities of soil and topography are always well illustrated by the plants they produce. The Pine-barren flora of New Jersey reaches northward into the Cape country, only losing some of its more southern types because of the shorter and severer seasons. But more diligent herborizing will no doubt reveal closer relationship between New Jersey and Cape Cod than we now know. An instance in my own experience illustrates this. The Striped Sedge (*Carex striata*, var. *brevis*) is recorded as a rare plant, growing in Pine-barrens from New Jersey southward, and yet in these Plymouth woods, in the half sandy marshes, I found it growing in profusion. Even eastern Massachusetts is in need of botanical exploration! So the floras run along this coast; and it is not strange that Cape Cod and New Jersey are both great Cranberry producing regions.

The country comprises an alternation of low, sandy elevations, and small swamps in which the Cassandra, or Leather-leaf, and other Heath-like plants thrive. The Pitch Pine makes open and scattered forests, or in some parts Oaks and Birches and other trees cover the better reaches. Fire has overrun the country in many places, leaving wide and open stretches carpeted with Bearberry (Arctostaphylos) and dwarf Blueberries. Clear and handsome little lakes are found in some parts of the wilderness, and everywhere one finds clear and winding brooks, abounding in trout. And over all the open glades the great-flowered Aster (*Aster spectabilis*) is brilliant in the autumn sun.

It is in the occasional swamps in this sandy region that the Cranberry plantations or "bogs" are made. In their wild state these bogs look unpromising enough, being choked with bushes and brakes. I am filled with a constant wonder that the sandy plains are not also utilized for the cultivation of Blueberries. These fruits now grow in abundance over large areas, and they are gathered for market. It would only be necessary to enclose the areas, protect them from fire and remove the miscellaneous vegetation, to have a civilized Blueberry farm. Certainly Cranberry and Blueberry farms would make an interesting and profitable combination. The expense of growing the Blueberries would be exceedingly slight, and the crop would be off before Cranberry picking begins. To be sure, wild berries are yet common, but they would not interfere with the sale of better and cleaner berries which would come from improved plantations. Wild Cranberries are still abundant over thousands of acres, and the production of cultivated berries is rapidly increasing; yet the price has advanced from fifty cents and one dollar per bushel, with an uncertain market, fifty years ago, to fifteen and twenty cents a quart.

The largest cultivated bog in existence lies about six miles north of Wareham, and is under the management of A. D. Makepeace, one of the oldest and most experienced Cranberry growers in the country. This bog is 160 acres in extent. Other bogs in the vicinity belong to the same management. These bogs are all as clean as the tidiest garden. The long and level stretches, like a carpet strewn with white and crimson beads, are a most pleasing and novel sight. Here in early September a thousand pickers camp about the swamps, some in temporary board cabins, but most of them in tents. The manager furnishes the provisions, which the campers cook for themselves, and he rents them the tents. One hundred and twenty pickers constitute a company, which is placed in charge of an overseer, and each company has a bookkeeper. Each picker is assigned a strip about three feet wide across a section of the bog, and he is obliged to pick it clean as he goes. The pickers are paid by the measure, which is a broad six-quart pail with ridges marking the quarts. Ten cents is paid for a measure. There is wide variation in the quantity which a picker will gather in a day, ranging all the way from ten measures for a slow picker to forty, and even fifty, for a rapid one; and in extra good picking seventy-five measures have been secured.

Various devices have been contrived for facilitating Cranberry picking. The Cape Cod growers like the Lumbert picker best. This is essentially a mouse-trap-like box with a front lid rising by a spiral spring. The operator thrusts the picker forward into the vines, closes the lid by bearing down with his thumb, and then draws the implement backward so as to pull off the berries. Perhaps a fourth of the pickers use the implements. Children are not strong enough to handle them continuously, and where the crop is thin they possess little advantage. Raking off the berries is rarely practiced in the Cape Cod region. It is a rough operation, and it tears the vines badly. Late in fall, if picking has been delayed and frost is expected or pickers are scarce, the rake is sometimes used. An ordinary steel garden rake is employed. The berries are raked off the vines, and the bog may then be flooded and the berries are carried to the flume, where they are secured.

This picking time is a sort of long and happy picnic—all the happier for being a busy one. The pickers look forward to it from year to year, and are invigorated by the change and the novelty.

The berries must now be sorted or "screened." If there are no unsound berries, the fruit can be fairly well cleaned by running it through a fanning mill; and some growers find it an advantage to put all the berries through the mill before they go to the hand screeners. A screen is a slatted tray about six feet long and three and a half wide at one end and tapering to about ten inches at the other, with a side or border five or six inches high. The spaces in the bottom between the slats are about a fourth of an inch wide. The screen is set upon saw-horses, and three women stand upon a side and handle over the berries, removing the poor ones and the leaves and sticks, and working the good ones toward the small and open end, where they fall into a receptacle. The berries are barreled directly if they are not moist, but if wet they are first spread upon sheets of canvas—old sails being favorites—and allowed to remain until thoroughly dry.

The cultivated Cranberry is a native of our northern states. It was first cultivated about 1810, but its culture had not become general until forty or fifty years later. The berries naturally vary in size and shape and color, and three general types, named in reference to their forms, were early distinguished—the Bell, the Bugle and Cherry. So late as 1856 there was no record of any particular named varieties aside from these general types. But there are many named sorts in cultivation now. Mr. Makepeace showed me seven varieties in his largest bog.

The common favorite is the Early Black, valuable because it comes in three weeks ahead of the medium sorts. Picking begins upon this variety about the 1st of September here. When fully ripe, the berries are purple-black, and for this reason they are favorites with consumers, for it is a common though erroneous notion that pale berries are unripe. In late fall the foliage of the Early Black assumes a purplish tinge, which quite readily distinguishes it from any other variety.

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Upon one of the upper arms of Buzzard's Bay is the old town of Wareham. Here the tides flow over long marshes bordering the inlet, and rise along the little river which flows lazily in from the Plymouth woods. Here the sea-coast vegetation meets the thickets of Alder and Bayberry and Sweet Fern, with its groups of Wild Roses and Viburnums. And in sheltered ponds the Sweet Water Lily grows with Rushes and Pond Weeds in the most delightful abandon. In the warm and sandy glades two Dwarf Oaks grow in profusion, bearing their multitude of acorns upon bushes scarcely as high as one's head. The Dwarf Chestnut-Oak is often laden with its pretty fruits when only two or three feet high, and it is one of the prettiest shrubs in our eastern flora.

Driving northward over the winding and sandy roads into the town of Carver, where the largest Cranberry plantations are located, our journey lies in the Plymouth woods. And here the surprises begin! We see no fields of Corn and Grass, and snug New England gardens, and quaint old houses whose genealogies run into centuries; but we plunge into a wilderness!—not a second growth, half-civilized forest, but a primitive waste of sand and Pitch Pine and Oaks! The country has never been cleared, and it is not yet settled! And in its wilder portions deers are still hunted and lesser game is frequent! And only fifty miles away is the bustling Hub of the universe!

This Cape Cod region is but a part of the sandy waste which stretches southward and westward through Nantucket, along the north shore of the sound and through a large part of Long Island; and essentially the same formation is continued along the New Jersey seaboard. Similarities of soil and topography are always well illustrated by the plants they produce. The Pine-barren flora of New Jersey reaches northward into the Cape country, only losing some of its more southern types because of the shorter and severer seasons. But more diligent herborizing will no doubt reveal closer relationship between New Jersey and Cape Cod than we now know. An instance in my own experience illustrates this. The Striped Sedge (*Carex striata*, var. *brevis*) is recorded as a rare plant, growing in Pine-barrens from New Jersey southward, and yet in these Plymouth woods, in the half sandy marshes, I found it growing in profusion. Even eastern Massachusetts is in need of botanical exploration! So the floras run along this coast; and it is not strange that Cape Cod and New Jersey are both great Cranberry producing regions.

The country comprises an alternation of low, sandy elevations, and small swamps in which the Cassandra, or Leather-leaf, and other Heath-like plants thrive. The Pitch Pine makes open and scattered forests, or in some parts Oaks and Birches and other trees cover the better reaches. Fire has overrun the country in many places, leaving wide and open stretches carpeted with Bearberry (Arctostaphylos) and dwarf Blueberries. Clear and handsome little lakes are found in some parts of the wilderness, and everywhere one finds clear and winding brooks, abounding in trout. And over all the open glades the great-flowered Aster (*Aster spectabilis*) is brilliant in the autumn sun.

It is in the occasional swamps in this sandy region that the Cranberry plantations or "bogs" are made. In their wild state these bogs look unpromising enough, being choked with bushes and brakes. I am filled with a constant wonder that the sandy plains are not also utilized for the cultivation of Blueberries. These fruits now grow in abundance over large areas, and they are gathered for market. It would only be necessary to enclose the areas, protect them from fire and remove the miscellaneous vegetation, to have a civilized Blueberry farm. Certainly Cranberry and Blueberry farms would make an interesting and profitable combination. The expense of growing the Blueberries would be exceedingly slight, and the crop would be off before Cranberry picking begins. To be sure, wild berries are yet common, but they would not interfere with the sale of better and cleaner berries which would come from improved plantations. Wild Cranberries are still abundant over thousands of acres, and the production of cultivated berries is rapidly increasing; yet the price has advanced from fifty cents and one dollar per bushel, with an uncertain market, fifty years ago, to fifteen and twenty cents a quart.

The largest cultivated bog in existence lies about six miles north of Wareham, and is under the management of A. D. Makepeace, one of the oldest and most experienced Cranberry growers in the country. This bog is 160 acres in extent. Other bogs in the vicinity belong to the same management. These bogs are all as clean as the tidiest garden. The long and level stretches, like a carpet strewn with white and crimson beads, are a most pleasing and novel sight. Here in early September a thousand pickers camp about the swamps, some in temporary board cabins, but most of them in tents. The manager furnishes the provisions, which the campers cook for themselves, and he rents them the tents. One hundred and twenty pickers constitute a company, which is placed in charge of an overseer, and each company has a bookkeeper. Each picker is assigned a strip about three feet wide across a section of the bog, and he is obliged to pick it clean as he goes. The pickers are paid by the measure, which is a broad six-quart pail with ridges marking the quarts. Ten cents is paid for a measure. There is wide variation in the quantity which a picker will gather in a day, ranging all the way from ten measures for a slow picker to forty, and even fifty, for a rapid one; and in extra good picking seventy-five measures have been secured.

Various devices have been contrived for facilitating Cranberry picking. The Cape Cod growers like the Lumbert picker best. This is essentially a mouse-trap-like box with a front lid rising by a spiral spring. The operator thrusts the picker forward into the vines, closes the lid by bearing down with his thumb, and then draws the implement backward so as to pull off the berries. Perhaps a fourth of the pickers use the implements. Children are not strong enough to handle them continuously, and where the crop is thin they possess little advantage. Raking off the berries is rarely practiced in the Cape Cod region. It is a rough operation, and it tears the vines badly. Late in fall, if picking has been delayed and frost is expected or pickers are scarce, the rake is sometimes used. An ordinary steel garden rake is employed. The berries are raked off the vines, and the bog may then be flooded and the berries are carried to the flume, where they are secured.

This picking time is a sort of long and happy picnic—all the happier for being a busy one. The pickers look forward to it from year to year, and are invigorated by the change and the novelty.

The berries must now be sorted or "screened." If there are no unsound berries, the fruit can be fairly well cleaned by running it through a fanning mill; and some growers find it an advantage to put all the berries through the mill before they go to the hand screeners. A screen is a slatted tray about six feet long and three and a half wide at one end and tapering to about ten inches at the other, with a side or border five or six inches high. The spaces in the bottom between the slats are about a fourth of an inch wide. The screen is set upon saw-horses, and three women stand upon a side and handle over the berries, removing the poor ones and the leaves and sticks, and working the good ones toward the small and open end, where they fall into a receptacle. The berries are barreled directly if they are not moist, but if wet they are first spread upon sheets of canvas—old sails being favorites—and allowed to remain until thoroughly dry.

The cultivated Cranberry is a native of our northern states. It was first cultivated about 1810, but its culture had not become general until forty or fifty years later. The berries naturally vary in size and shape and color, and three general types, named in reference to their forms, were early distinguished—the Bell, the Bugle and Cherry. So late as 1856 there was no record of any particular named varieties aside from these general types. But there are many named sorts in cultivation now. Mr. Makepeace showed me seven varieties in his largest bog.

The common favorite is the Early Black, valuable because it comes in three weeks ahead of the medium sorts. Picking begins upon this variety about the 1st of September here. When fully ripe, the berries are purple-black, and for this reason they are favorites with consumers, for it is a common though erroneous notion that pale berries are unripe. In late fall the foliage of the Early Black assumes a purplish tinge, which quite readily distinguishes it from any other variety.

The Dennis is a bugle berry, of good size, productiveness and bright scarlet color. The fruit is picked late in September and early in October. The foliage is darker than that of the Early Red.

The McFarlin, an oval, dark red berry, is probably the largest late berry grown.

The Gould is a productive pear-shaped berry, of medium season, with a bright purple fruit and light colored foliage.

The Lewis is probably the most brilliantly colored of the Cranberries. It is a very bright glossy scarlet, medium in season and pear-like in shape.

The Franklin is a comparatively new pear-shaped sort, as late as Dennis, purple-red, with a high habit of growth. It appears to have little to recommend it above older sorts.

A new berry which Mr. Makepeace showed me appears to combine more merits than any berry which I have ever seen. Some twelve years ago he observed the original plants in a neighbor's bog, occupying a space about six feet square, and he procured a few cuttings. The small bog which he now has of it is well worth a journey to see. The berries are unusually large, cherry-shaped, a little later than Early Black, and a bright rose-purple. It is probably the largest early berry. I take pleasure in calling it the Makepeace.

It is an arduous duty to subdue a wild bog. The bushes and trees must be removed, roots and all, and it is usually necessary to remove the upper foot or so of the surface in order to get rid of the roots, bushes and undecayed accumulations. This process is termed "turfing." The turf is commonly cut into small squares and hauled off. It is necessary to leave the surface level and even, in order that all the plants may have an equal chance and thereby make an even and continuous bed, and to avoid inequalities in flooding. Although the Cranberry thrives in swamps and endures flooding at certain seasons, it nevertheless demands comparative dryness during the growing and fruiting season. The swamp must therefore be drained. Open ditches are cut at intervals of four or five rods, about two feet deep, and these lead into the main or flooding ditch. It is also often necessary to run a ditch around the outside of the bog to catch the wash from the banks. The areas enclosed within the intersections of the ditches are called sections, and each section is planted to a single variety. The main ditch is usually a straightened creek, or it carries the overflow from a reservoir which may be built for the purpose of affording water to flood the bog. Growers always divert a creek through the bog if possible. In the Cape Cod districts these creeks are often clear trout brooks. The main ditch is strongly dammed to allow of flooding.

Before planting, the bog is sanded. This operation consists in covering the whole surface with about four inches of clean and coarse sand, free from roots and weeds. The chief object of sanding is to prevent too rapid growth and consequent unproductiveness of vines. In wild bogs, the Cranberry rarely roots deeply in the muck, but subsists rather in the loose sphagnum moss. Vines that grow in pure muck rarely produce well.

The sand also serves as a mulch to the muck, mitigating extremes of drought and moisture. It also prevents the heaving of the vines in winter, and it aids in subduing weeds. Every four or five years after the bog begins to bear it is necessary to resand it, in order to maintain productiveness. These subsequent applications are light, however, seldom more than half an inch in depth. The Cape Cod bogs are fortunate in their proximity to the sand.

It was once the practice to plant Cranberry-vines in "sods," or clumps, just as they are dug from the swamps. There are several vital objections to this operation, and it is now given up. It is expensive, the vines are apt to be old and stunted, an even "stand" can rarely be secured, and many pernicious weeds and bushes are introduced. Cuttings are now used exclusively. These are made from vigorous runners and are six or eight inches in length. They are thrust obliquely through the sand, about an inch and a half or two inches of the tip being allowed to project. They are set in early spring, about fourteen inches apart each way. In two or three weeks they begin to grow, and in three or four years a full crop is obtained. The subsequent cultivation consists in keeping the bog clean. A small force is employed during the summer months in pulling weeds. Under ordinary conditions it costs from $300 to $500 per acre to fit and plant a bog.

There are those who contend that flooding is not necessary. It appears to be generally held that bogs are longer lived and more productive if judiciously flooded. The reasons for flooding, so far as I know, are five: (1) To protect the plants from heaving in the winter; (2) to avoid late spring and early fall frosts; (3) to drown out insects; (4) to protect from drought; (5) to guard against fire, which sometimes works sad havoc in the muck. Mr. Makepeace prefers to flood but once a year, unless insects appear in serious numbers. He lets on the water in December and draws it off in April or early in May. Just enough water is used to completely cover the vines in all parts of the bog.

There are many hindrances to Cranberry growing. The chief are spring and fall frosts, hail, numerous insects and some fungous diseases. During the summer season the bogs are not flooded, and insects must be kept in check by insecticides. Tobacco water is commonly used. The liquid is applied with hand pumps from tanks. It is supposed that it has some value as a fertilizer also.

Fifty barrels per acre is a good crop of Cranberries, yet 200 barrels have been produced. The grower usually gets from $5 to $10 per barrel of 100 quarts. It does not appear to be known how long a well handled bog will continue to be profitable, but Mr. Makepeace assures me that he knows a bog thirty years old which is still in good condition.—*Professor L. H. Bailey in American Garden.*

New or Little Known Plants.

Clematis Stanleyi.

ALTHOUGH discovered about fifty years ago, and figured in Hooker's "Icones Plantarum," t. 589, where it is described as "the handsomest species of an extensive and handsome genus," this Clematis has only recently been introduced into cultivation. It has already been notlced in Garden and Forest as being in flower at Kew, and our illustration (see p. 513) has been prepared from a plant there. It appears to be not uncommon in the eastern provinces of the Cape; Burke, who collected for Lord Derby, in compliment to whom the species was named, having first found it in Macalisberg. The Kew plants were raised from seeds collected in the Transvaal by Mr. E. Galpin, who described the plant as "a shrubby Clematis, not more than three feet high, with deeply cut silky leaves and large pinkish or pale purple flowers. The fruit when ripe is a beautiful object, as elegant as a bunch of ostrich feathers and silvery white. At first I thought it was an Anemone. It is a very ornamental plant, and may, by crossing it with the garden Clematises, produce a new race."

In a recent communication Mr. Galpin states that the plant is abundant at high altitudes where frost is frequently known, and suggests, therefore, that it may prove to be hardy in England. Some plants placed outside last year at Kew perished in the winter. The best plants are those which have been from the first in a border in a sunny greenhouse. These have grown a yard high, the leaves are almost as silvery as those of the Silver-tree itself, and the flowers have been abundant since the middle of July. A bed of plants in a sunny position out-of-doors has been only moderately successful, the summer weather this year in England having been unfavorable to plants which enjoy sunlight, warmth and not too much moisture. There is every prospect of this Clematis proving a first-rate garden-plant; if it will grow well outside, and flower as well as it does at the Cape, it will be almost as useful as *Anemone Japonica.* The whole plant is clothed with a silky tomentum, which in the sun gives it an attractive silvery sheen. The roots are fleshy, the stems tufted, herbaceous, branching freely from below, erect; the leaves opposite or alternate, six to nine inches long, bipinnate, the pinnæ variable in size and lobing. The flowers are terminal and axillary, the peduncles are six inches long, erect, curved near the top, and each bears one flower, which is two and a half inches across, cupped at first, almost flat before fading, the segments thick and fleshy, broadly ovate, with prominent veins. The color varies from dull purple to rose, and some of the plants are almost white flowered. The stamens are in a large cluster and yellow. Every flower is followed by a head of fruit. The stems are annual, and the plants should be kept on the dry side whilst resting. They start into growth in early spring, and as the first lot of stems flower a second lot is pushed up from the base of the plant, which are in bud ere the first lot of flowers have faded.

Kew. W.

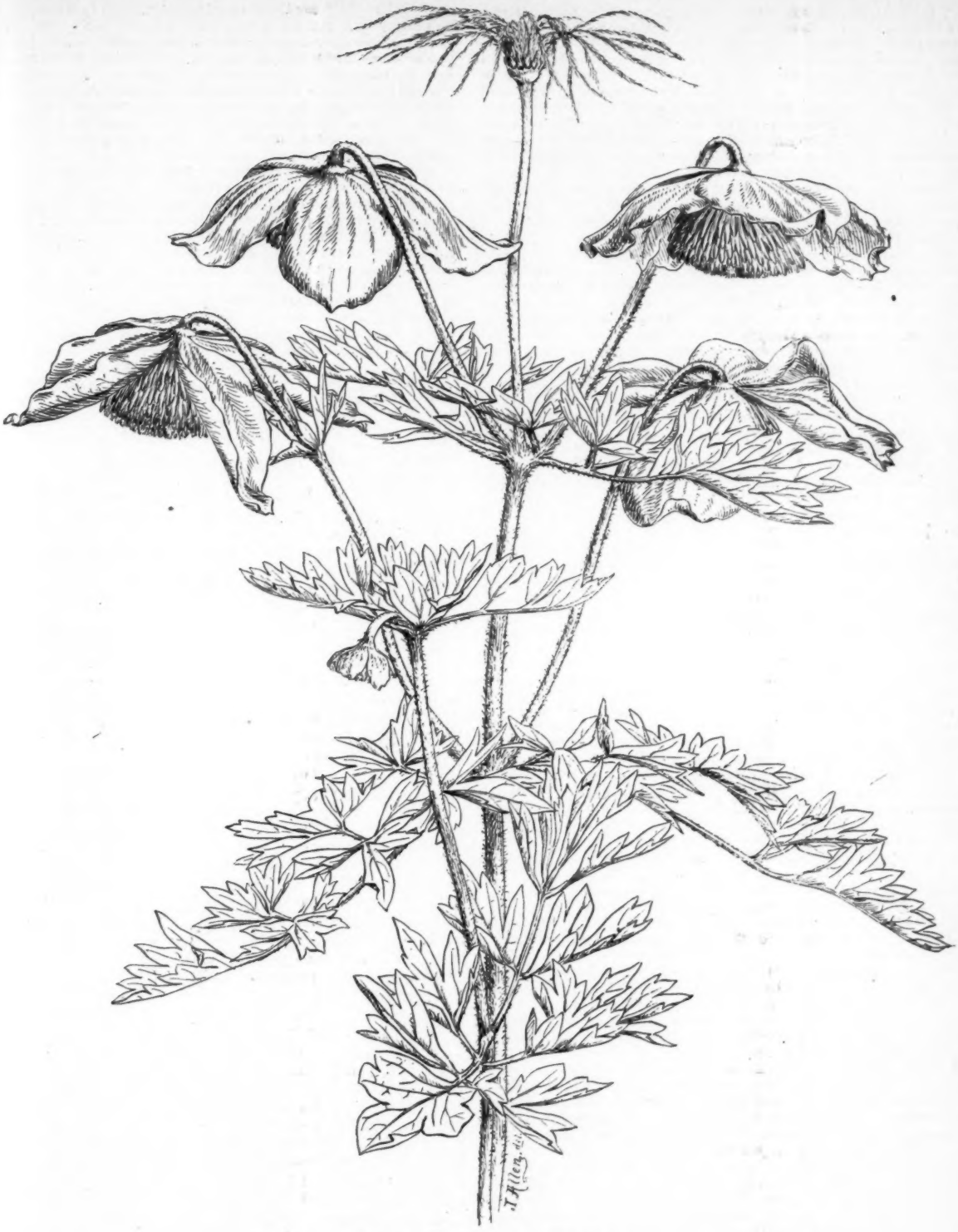

Fig. 65.—Clematis Stanleyi.—See page 512.

New Orchids.

MASDEVALLIA FULVESCENS, Rolfe, is a pretty little species introduced from New Granada by Messrs. Fred. Horsman & Co., of Colchester. It is apparently allied to *M. infracta*, Lindl., but with more brightly colored flowers. These are of a light buff yellow, shading into purple-brown on the constricted sides of the throat. It is described and figured in the *Gardeners' Chronicle*, September 25th, p. 325, Fig. 65.

MASDEVALLIA × STELLA, Rolfe, is a very pretty little hybrid, raised by Captain T. C. Hincks, of Thirsk, Yorkshire, from *M. Estradæ*, fertilized with the pollen of *M. Harryana*, and which flowered for the first time during the present summer. It is quite intermediate between the two parents, the tall scapes,

the lateral sepals, the color resembling the pollen parent, while the other floral characters, and also the leaves, more nearly resemble those of the mother plant. It is a distinct and elegant little hybrid.—*Gardeners' Chronicle*, September 20th, p. 325.

Lælia × Juvenilis, A. Bleu, is a handsome hybrid, raised from *Lælia Perrinii* fertilized with the pollen of *L. pumila*, in the collection of Mr. Alfred Bleu, of Paris. It is quite intermediate in character, both in the organs of vegetation and in the flower, though in this latter particular the descent from *L. Perrinii* is the most clearly marked. The sepals and petals are of a rosy lilac shade, as are also the side lobes of the lip, while the throat is white and the front lobe of a deep carmine shade. The peduncle bears a single flower.—*Orchidophile*, August, 1890, p. 240, with plate.

Lælio-Cattleya × Proserpine, Rolfe, is a pretty little hybrid raised in the establishment of Messrs. James Veitch & Sons, of Chelsea, by Mr. Seden by crossing *Lælia pumila Dayana* with the pollen of *Cattleya velutina*. The flower is over three inches in diameter, decidedly approaching the pollen parent in shape, though with the color, also the habit of the plant, more like the seed parent. It received an Award of Merit from the Royal Horticultural Society on August 26th last.—*Gardeners' Chronicle*, September 27th, p. 352.

Cattleya Gaskelliana picta, Rolfe, is a striking variety in the collection of the Right Hon. J. Chamberlain, of Birmingham, in which the petals have a broad central band, with a few radiating branches of light purple on a lilac ground. The sepals are less distinctly variegated with the same colors.—*Gardeners' Chronicle*, September 27th, p. 352.

Kew. *R. A. Rolfe.*

The Coco-de-Mer.

THE successful germination of several nuts of the Coco-de-Mer or Double Cocoanut (*Lodoicea Seychellarum*) deserves to be recorded as an event of more than ordinary interest. These nuts have been known to germinate at Kew and elsewhere before now, but they have invariably perished before the first stage of germination was passed. At Kew, however, there is now a plant with a leaf three feet long and nearly as wide, and having a mass of healthy roots, whilst two other seedlings are in a most promising condition.

The Coco-de-Mer is perhaps the most remarkable member of the Palm family. In every character, from its seeds to its gigantic crown of leaves, it is Titanic. For centuries its history was involved in mystery. Its enormous seeds found floating on the Indian Ocean were supposed to be the product of a tree which sailors declared they had seen growing beneath the sea. They were claimed as royal property whenever found, and sold for enormous prices, a ship laden with merchandise having been given for a single nut.

The discovery of the Seychelle Islands in 1743 revealed the true source of these mysterious nuts. Even this, however, did not entirely divest the tree of its supernatural character, for only a few years before his death General Gordon declared his belief that this Palm was the Tree of Knowledge of Good and Evil which stood in the Garden of Eden. The General united an ardent love of plants and considerable botanical knowledge with his military duties, and during several years' residence in the Seychelles, about ten years ago, he made numerous drawings of the Coco-de-Mer, and elaborated his theory that the small island of Praslin, where this Palm is native, was the site of the Garden of Eden. His drawings and notes are now at Kew.

Putting aside all fabulous stories relative to the Coco-de-Mer, and viewing it in its purely botanical character as a Palm, it yet remains a vegetable wonder. Its restriction to two or three very small islands in the Seychelles group, when considered along with its wide difference from all other Palms, gives it a position of the highest importance in geographical botany. The value of its nuts for museums and as ornaments, with the use of its young leaves in basket-making by the natives, threatened its extermination, and it was only when the Linnæan Society made a strong appeal to the Colonial authorities that the danger of its becoming extinct was averted.

The height of the mature trees is from 60 to 150 feet. The trunk is smooth, marked with rings, and about a foot in diameter, except at the extreme base, where it is swollen, onion-like, and surrounded by a hard shell-like covering like an immense socket. The leaves form an enormous crown, each one being twenty feet long by ten feet wide in the blade, and the pole-like petiole proportionately large and strong. The male and female flowers are borne by different plants. The male inflorescence is in the form of a gigantic willow catkin, six feet long by four inches in diameter. The females are four feet long, and each spike bears from six to ten fruits. These are in the form of huge acorns, and when mature weigh from twenty-five to thirty pounds each. The seed is about a foot long by two and a half feet in circumference. It is deeply two-lobed at both ends and channeled down the middle, so that it looks like two oblong nuts joined by their sides. The nuts are seven years in ripening and about two years in germinating. The trees begin to bear when about forty years old and are said to reach maturity in 120 years.

The germination of the nuts is very remarkable. From between the lower lobes a stout radicle is pushed to a length of about four feet (General Gordon says twelve feet). This thickens to a circumference of a foot or so near the end, where it finally splits to allow the growth of the plumule, which is on the same large scale as everything else in this Palm.

If Kew succeeds in growing plants from these promising seedlings it will be an achievement beside which the flowering of the Giant Amorphophallus and the cultivation of the Welwitschia will count for very little.

The Palms of the Seychelles are amongst the choicest of those cultivated in gardens. The Stevensonia, Verschaffeltia and the Latanias (not Livistonas) are unequaled for nobleness of character. There are large specimens of all the Palms known in the Seychelles at Kew, except, of course, the Lodoicea.

Kew. *W.*

Cultural Department.

Autumn Work in the Hardy-Flower Garden.

WITH the closing up of out-door work no time should be lost in preparing, as far as possible, for next year's display. Those who intend making borders of hardy perennials, or even planting in a limited way, should bear in mind that a border of this description is not for a season only, but that this class of plants are planted to stay and that the preparation must be better than that made for annuals. If the soil be uniformly heavy and retentive, part of the border should be made drier by the liberal application of coarse sand and lime rubbish. Many plants thrive admirably in a dry soil which would not grow in that of a moist nature, and vice versa. The right kind of soil is, therefore, the first consideration. Another point worth remembering is that an herbaceous border, when once planted, should never be disturbed with a spade, except to make changes in it; for even to one understanding border-plants it would be impossible to use a spade among them without injury. It is generally best, in soils of a retentive nature, to stir the surface of the beds in spring, but the use of the fork had better be deferred until the ground is in good condition, and then many of the plants will have started into growth, and may easily be seen and injury avoided. Where plants are to be procured or replanted it should be done at once, before the soil loses more of its warmth, so that the plants may become well rooted before cold weather. At this time the soil is often warmer than the air above it, and it is surprising how newly planted things take hold and establish themselves—much more readily than in spring, when the soil is cold for some time after the air has become warm enough to start into growth plants which are already established. Perennial plants require good soil, as they cannot be dug over in spring for the purpose of working in a fertilizer. The best way to keep them well nourished is to apply a good top-dressing of manure in the fall as soon as growth ceases; a uniform covering of four or five inches will not be too much, as, if the manure is well decayed, so that it may be cut with a spade, there will remain very little to be raked off in spring. When bulbs are planted it is best to have them as nearly as possible together, as these need somewhat different treatment from herbaceous rooted plants. For instance, such bulbs as *Iris reticulata, I. Anglica*, the tuberous rooted Anemones, Spanish Iris, Californian Lilies, many Japanese and European kinds, and in fact any rare or tender bulbs, will be the better for a good coat of dry leaves; they should be covered with a spare sash or shutter, taking care to guard against the ingress of mice, which are very liable to make snug homes in such warm quarters. We have found that the best way to get rid of field mice is to soak wheat or corn in a solution of strychnine, the poison killing them at the first taste. In passing, it may be remarked that this has been found the best way to keep mice away from seeds. When first sown in pans we had endless trouble and vexation until strychnine was used.

A short time since it was advised to plant Narcissus nine inches deep. I had in mind soil of a sandy nature; but on examining the garden of a friend recently I quite agreed with

The Madroña (*Arbutus Menziesii*).—See page 509.

him that Narcissi would not push their way through nine inches of red clay soil. With a wet, heavy soil it is best to prepare a plot for bulbs by adding plenty of sand, using also a good handful at the base of each bulb. Tritonias (Kniphofias), *Arundo donax*, Eulalias, *Anemone Japonica* and any plants of doubtful hardiness should be lifted now and wintered in soil in the cellar; the plants are always the better for it next year if planted out early in newly enriched soil.

South Lancaster, Mass. *E. O. Orpet.*

Dahlias.

THERE are no more useful, showy and satisfactory flowers in the late summer and fall than the Dahlias. Continuing in bloom till cut off by the frost, they furnish a constant supply of bold, handsomely colored flowers until the Chrysanthemums come on. Probably no flower has been more subject to popular caprice, for the flower-loving public alternately takes up and discards the various forms. In some gardens the old double forms are still grown, but in most gardens one notes a change to the Pompons, Single, and lately to the Cactus forms. The latter are, of course, merely a reversion to the more natural types and such as readily come from seed. While the very double Dahlias are noble flowers, and mostly of pure colors, there is a formality about them which is not pleasing to many, especially when they are cut with short stems. So common is this habit of cutting that for some years I would not admit the flower to the garden, so firm was the impression of stiffness received from seeing the blooms at exhibitions. Probably many others are as unduly prejudiced. The Pompon Dahlias are a very satisfactory strain. The habit of the plants is dwarf; they are also free bloomers, with small flowers of a very useful size. A few years since some bright cultivator took advantage of the preference for single flowers of all kinds and reintroduced the single Dahlias as a new departure. These are generally brilliant in color and free-flowering, and they at once secured attention, and have become established favorites. Their merits are certainly great, for they are excellent for bouquets, though fading rather soon, and they are showy and free from stiffness. As garden plants they are ornamental, with the fault of bearing too many seed, and the necessity of keeping these cut off makes them somewhat of a care. The forms of single Dahlias now offered are innumerable, and it seems scarcely worth while to name them, as from a packet of seeds sown early in the year a great variety may readily be had. Latterly the Cactus varieties, as the semi-double kinds are called from their fancied resemblance to Cactus blooms, have been finding special favor, because, while free from the formality of the double kinds, they are more lasting, and do not so quickly go to seed as the single ones. Of these, Juarezii seems to remain the best of the dark red or crimson ones, though a somewhat shy bloomer. Constance and A. W. Tait are the best whites; the latter, a variety from Portugal, is an especially distinct flower, with serrated, graceful petals, more resembling a good, full, reflexed Chrysanthemum than a Dahlia. Mrs. Hawkins is a pleasing kind, with cream centre, shading to a delicate salmon-pink. William Pearce is a free, fine yellow. There are numerous varieties of Cactus Dahlias, but the above are kinds which may be had of most growers making a specialty of these plants. Mention might also be made of Gracilis Dahlias, a strain of single flowers with wonderful stripings, spots and variations, and well worth growing from seed.

Newark, N. J. *J.*

Notes on Native Ferns.

Aspidium cristatum is a good Fern for cultivation in any light soil that never becomes very dry. A fine loam suits it well, or clay and peat will answer. Its natural home is usually moist, low grounds in a peaty soil. It seems to prefer the sun, and is frequently found near and about old stumps or decaying logs in low pastures or meadows. Its fertile fronds are tall and narrow and die early in autumn. The sterile ones are shorter and often almost survive the winter. Its variety, *Clintonianum*, is a much larger form, and grows mostly in Ash swamps. It is much like the typical species, except in size and in its preference for the shade. It is a handsomer Fern than the true *cristatum* on account of its size.

Aspidium Thelypteris grows in locations similar to those in which *A. cristatum* delights, but is much more abundant. Its stems are usually longer than the fronds. The fronds are of a delicate texture, and quickly wilt when cut, or die with the first frost. It spreads rapidly, and a few plants soon form a thick bed. It will thrive well in shade, but, when growing naturally, the best plants are frequently in the sun. It is one of the easiest Ferns to grow.

Aspidium aculeatum, var. *Braunii*, is a rare Fern, but not so rare as the preceding, nor is it difficult to grow. It seems to thrive in any ordinary garden-soil, in shade, and is a fine plant when well established. Small specimens are the best for planting, and they will soon attain full size. This Fern is found along the margins of cold mountain-brooks and in cool mountain-ravines of northern New York and New England. Its height varies from a few inches in small plants to more than two feet in the largest specimens; the dark green fronds have a chaffy stem.

Aspidium Noveboracense has medium sized fronds a foot or more in length, and three or four inches wide at the middle, from which they taper to both ends. They are of a light green color, thin, wilt quickly when cut and are killed by the first frosts. This species is most commonly found in moist, thickly shaded places, and it requires a light, moist, well drained soil and more shade than most kinds. It is easy to manage when properly placed.

Aspidium fragrans.—The Fragrant Fern is one of our rarest natives, and its natural home is always a peculiar one. It seems to require a situation where it can obtain the very small amount of moisture it needs principally from the surrounding atmosphere. Dry, shaded cliffs are its choice, with an atmosphere rather moist. Among the mountains there are fogs that rise and fall about such cliffs, and where the right conditions, so far as shade, etc., exist, it is sure to grow. But these conditions are rare. At Bolton Falls, Vermont, there are dry, shaded cliffs just above or near the falls. Here this Fern is found, and at a low elevation; for the mist from the falling water is just what is required to cool and moisten the atmosphere, and is no doubt essential to the existence of the plants. On the dry cliffs of the Saguenay River, in Canada, the Fragrant Fern grows larger and more abundantly than in any other place I have seen it. Here the plants are often more than twice as large as specimens from New England. It is a handsome evergreen plant, with numerous fronds from three inches to a foot in length by half an inch to two inches wide. The dried fronds have an agreeable odor, hence its name. I have never grown it, and I judge from its peculiar habitat that it is not easy to manage out-of-doors.

Southwick, Mass. *F. H. Horsford.*

The Borsdorfer Apple.

IN discussing the varieties of winter fruit among our imported Russian Apples, the one numbered 402 in the Department list has often been referred to. I received cions of it from Mr. Aaron Webster, of East Roxbury, Vermont, some fourteen years ago, and with it a sample fruit, which exactly resembled a small Ben Davis. Mr. Gibb, in his careful review of the Department list of Russian Apples, printed in the Report of the Montreal Horticultural Society for 1883, quotes what I had written to him of this sample, and gives no other description, though he gives the favorable opinions of Mr. Sias, of Minnesota, and Mr. Tuttle, of Wisconsin, on the hardiness of the tree.

My trees of this variety were planted in an unfavorable place, not only for rapid growth, but also for getting any fruit, being set by the roadside; but I found with the first fruiting that it bore not the least resemblance to Ben Davis. The variety is a slow grower at best and disposed naturally to form a round, bushy head, requiring frequent pruning to produce that openness essential to high coloration of the fruit. This year I have had, and was able to gather, a good number of characteristic specimens; and it happened, as some of them lay upon the writing table before me, that in turning over the leaves of Downing's "Fruit Trees" the name of "Borsdorfer" arrested my eye, and reading the description, I was pleased to find this to be the very Apple in question.

Borsdorfer, as given in Downing, presents the infallible mark of wide distribution and general popularity in the number of its synonyms. In England it has received the names of King George III, Garret Pippin, Queen's and King. In France it is called Reinette Batard and De Misnie, also Le Grand Bohemien Borsdorfer. It has several German names, in all amounting to ten; and Downing, without saying whether it had then been brought to America, calls it "a celebrated German Apple," and gives this description: "Roundish oval, narrowing at the eye; skin pale yellow, with a full red cheek, sprinkled with a little russet; flesh yellowish white, very firm and crisp, with a rich, brisk perfumed flavor; November to February."

This agrees exactly with my Apple in every particular; but Downing omits so many other points which he always gives in describing a fruit he has seen, that it is fair to assume that it first reached this country in the Department importation.

The cavity and basin of this apple are small and shallow, with some russet about both. The stem is slim, and about an inch long. Basin corrugate, calyx closed. A marked characteristic is the large, but not numerous dots, brown on the yellow skin, dark on the colored part. Core medium, seeds short, plump and light colored. The high piquant flavor is notable, even before the fruit becomes mellow enough to be eatable. I think the season will be December to April in New England—and here we have, if not a Russian, at least an iron-clad apple of high quality and a good keeper. Being so fair and handsome, and little, if any, smaller than Fameuse, I do not see why it will not be a good commercial apple. The rather dwarf habit and compact growth of the trees make it a good garden variety.

Newport, Vt. *T. H. Hoskins.*

Strawberries.—Character of growth has to be considered in our estimate of Strawberries to a greater degree than has been my practice at least. My favorite late berry is the Summit. But it makes runners so very slowly that I find it hardly possible to keep up a bed of them. On the other hand, Crystal City is such an enormous multiplier that it makes very quickly a solid mat and is unable to produce good fruit. Going over my beds to select what I should call really good growers, making rows readily, but not too rampant, I should select Bubach No. 5, Cumberland and Haverland. Sharpless is on my soil generally a model, but not always; I am obliged to renew them oftener than I like. I can report on the growth of some of the newer berries as follows: Mrs. Cleveland makes fine growth on clay soil; Michel's Early fine; Eureka perhaps better yet; Lady Burk as good. Gypsey makes medium plants, and Crawford, Viola and Warfield are no more than medium. Luella has shown up poorly. Of Thompson's seedlings I have 4, 52, 54, 7, 9, 51. These are all making thrifty growth.

Clinton, N. Y. *P.*

Hymenocallis macrostephana is the most robust as well as the most beautiful and fragrant of all the species of the genus. The large, pure white, deliciously scented flowers are arranged in dense umbels raised well above the leaves, which are about two or two and a half inches long, oblanceolate, and bright green, and in themselves exceedingly decorative even when the plant is not in flower. My plant, received a few years ago from B. S. Williams, of London, blooms regularly every year in September. The bulb has attained a large size, but as yet has made no offsets. It is grown in a compost consisting of equal parts of well rotted stable manure, leaf mould and sand. All the Hymenocallis in my possession—namely, *H. speciosa*, *H. ovata*, *H. littoralis*, *H. Caribæa*, *H. expansa*, *H. crassifolia* and *H. Galvestonensis*—grow and flower in a living-room as freely as Geraniums. *H. macrostephana* exceeds them all in vigor and in ease of management. The flower-stem, which is thrown up from the heart of the bulb, reached this year the height of seventeen inches, and produced an umbel consisting of seven flowers, each eight and a half inches long, with a cup three inches broad and segments four and a half inches long. Their vanilla-like perfume is so strong that one flower scents a large room and a flowering umbel an entire house. No one seems to know where this species, the best of the genus, comes from. Mr. Baker, of the Kew Herbarium, who has devoted a great deal of attention to the study of these plants, is of opinion that it may prove a hybrid between *H. speciosa* and *H. (Ismene) calathina*. I grow my plant in summer in the open air in a half shady situation, and bury the pot to the rim in coal ashes.

Milwaukee, Wis. *H. Nehrling.*

Dendrobium aqueum.—This species has been in cultivation almost fifty years, having been first imported from Bombay in 1842 by Messrs. Loddiges, of Hackney, in whose nurseries it flowered the following year. It extends southward in greater or less quantities along the mountains of the Malabar coast, growing on the trunks of trees and bushes. It is not often, however, that plants are seen in collections, and the reason is difficult to explain, because when well grown *D. aqueum*, or, as it is perhaps more popularly known, *D. album*, presents an attractive appearance. In the beginning of September a fine specimen was exhibited by Mr. T. Statter at the Royal Horticultural Society, and almost every stem bore several white flowers, each one being a half to two inches across, and arranged either singly or in fascicles of two and three. The upper sepal is oblong-acute, the lower ones more or less triangular, while the ovate petals are somewhat broader. The lip is three-lobed, the anterior segment being finely toothed on the margin, and having a downy pubescence on the upper surface, which is tinged with yellow at the base. The stems, which are more or less decumbent, are from one to two feet long, yellowish green when young and having an oblong-lanceolate, deep green, leathery leaf about three or four inches long at each node.

D. aqueum may be grown equally well in baskets or in pots well drained with clean crocks. The usual compost is rough peat, with a little moss and charcoal added. Plenty of water may be given when the growths begin to develop rapidly, and as much light as possible, without exposing the plants to the direct rays of the sun on very hot days. The temperature in summer during the day-time may range from seventy to eighty degrees Fahr. and a few degrees lower at night, while in winter, when the plants are taking a short rest, a temperature of sixty to seventy degrees Fahr. will be found sufficient until the new growths show signs of breaking.

Isleworth, London, W. *John Weathers.*

Hardy Perennials from Seed.—As I have succeeded so much better of late years with seeds of hardy herbaceous plants sown in late fall or winter than when sown in spring, I have determined to sow all the seeds of these plants in November. I shall allow them to freeze and then cover with mats and shutters, and not open them until early spring. I have been led to do this mainly by the uncertain way a large number of species of hardy-plant seeds germinate when sown in spring. Too often we are disposed to say, when seeds fail to come up in six weeks or two months, that the seed is bad; but if we note the straggling way in which many kinds of spring-sown seeds come up all through the ensuing summer, and that many do not germinate in any quantity until the spring following, we cannot help thinking there is a reason. In the case of Pæonies, Hellebores, Clematis, Cimicifugas, Actæas, perennial Adonis, Thermopsis, Petalostemon, Baptisias, some Pentstemons, Liliaceous plants generally, and Gentians, we should conclude that they might better be sown as soon as ripe. These are the worst cases of slow germination; but even in the case of others, which ordinarily come well, I think it better to sow in fall. As it is only by experience that we find just which kinds to sow early in the season, I have decided to wait until freezing weather. *Alyssum saxatile*, Aubrietias, Campanulas, Cheiranthus, Delphiniums, Dianthus, Iberis, Lychnis, Papavers, Silenes and many others if sown before freezing weather would germinate and be lost.

By this plan time is saved. The work of seed sowing in spring is too often deferred, for one reason or another, until well on in March. By that time the sun has attained considerable power, necessitating frequent watering, so detrimental to germinating seeds. I prefer to use square, shallow pans; space is saved, as well as its being easier to divide up the pans for two or four lots of seeds should it be desirable. Ordinary loam, free from manure or other decaying vegetable matter, is best. The finest seeds should not be covered and the larger ones slightly, pressing all down, after sowing, with a brick. Plunge in sand, certainly not in litter or other decaying matter liable to the development of Fungi or the harboring of vermin. There will be no necessity to open, except for inspection, before the middle of February. Then give air every bright day, and we shall be surprised to find how soon seedlings will begin to appear.

A Reserve Garden.—This is a necessity where hardy plants are grown. It may be an experimental garden as well. Odd corners are generally utilized; but a handy square patch, laid out in sections, with water convenient, would be better. Just as soon as any seedlings become large enough to handle they could be pricked off into other pans or shallow boxes, afterward to be transferred to the open ground. It is always a pleasure to know a stock is at hand to fill up gaps in spring. There is no doubt they will occur as long as inexperienced men are employed to "dig up" borders. I have often regretted, through press of other work, having to forego the pleasure of going over the borders myself. I am opposed to digging. An overhauling, or taking of stock, is all that is necessary, except every four or five years, and then trench and replant.

Wellesley, Mass. *T. D. Hatfield.*

The Autumn-Bearing Raspberries.—The fact that fruits are most abundant at this season is, perhaps, the reason why Raspberries that fruit in the autumn have not become more popular; and as many amateur fruit-growers may not know that we have varieties of this fruit which bear freely in autumn, I state that a few sorts of the Red Raspberry, under ordinary culture, mature two crops of berries during the season, the first at the usual time for Raspberries, and the second during September and October. The new growth of these varieties commence to bloom late in summer. The fruit from these early

flowers, which are borne near the outer ends of the canes, commences to ripen early in September and continues to mature until checked by hard frosts. A sufficient number of the flower-buds fail to open in the fall to make a fair second crop the following summer. By cutting off the new growth late in autumn or early in the spring the summer crop may be prevented, and a much larger autumn crop is the result. I am now growing a variety called the Erie. At this date (October 9th) it is well laden with fine fruit, and in New York I have gathered ripe fruit from this variety as late as October 25th. Despite the cool weather of the past few weeks the berries have matured rapidly, and are fully equal in flavor to those that ripened on the same bushes in July. The mature fruit remains on the plant much longer in autumn than in summer, and it is not injured by moderate frosts.

It has occurred to me that the autumn Raspberries might have an especial value in northern localities, where the Grape cannot be grown and only the Crab-apple among tree fruits succeeds. By cutting off the stems in autumn the roots could easily be protected during winter, while the flowers coming out at midsummer would not be endangered by frost.

University of Wisconsin, Madison. *E. S. Goff.*

Correspondence.

The American Elm.

To the Editor of Garden and Forest:

Sir.—The illustration of the Feathered American Elm in Garden and Forest (p. 467) has an especial interest for me, as it calls to mind several handsome specimens of the same class growing on my father's homestead in southern New York. The tall, columnar trunks of these primeval Elms often rise to the height of fifty feet before dividing into branches, yet from the ground they are clothed with numerous tufts of slender, and often drooping, shoots, which, in summer, give to these noble trees a very unique appearance. These tufts often arise from roundish, knotty protuberances of greater or less size, which give the trunk a rugged and picturesque aspect.

On the same farm, until within a few years, stood another venerable American Elm, which, in habit, was the exact opposite of the ones above described. In place of a lofty, towering trunk, with strongly ascending branches at the summit, this motherly old tree divided, at the height of a man's head, into several massive branches, which extended horizontally a distance of thirty feet or more, and finally broke up into slender, drooping spray that literally reached the ground.

I have often queried if these strikingly different habits might not be perpetuated by grafting. I had formerly supposed that the peculiar forms assumed by these trees were due largely to the influence of other trees that grew up with them and have long since been cut away, but observation of the habits of isolated trees that have largely grown up within my recollection do not require any such explanation. Surely no other native forest-tree has a greater tendency to variation in form than the American Elm.

When left to itself, the American Elm often shows a tendency to develop only two, three or four principal branches, which grow out to a great length and often curve downward more or less at their extremities. When grown as a lawn or road-side tree, this habit is objectionable because it tends to make the head unsymmetrical and poorly furnished with foliage, while the long and slender branches are likely to be broken off by winds.

To prevent this undesirable form it is necessary to watch the growth of the young trees and severely head in the shoots that show a tendency to outstrip their companions. This will secure the formation of a number of principal branches, which not only increase the symmetry of the head and clothe it with dense masses of verdure, but enable it to endure high winds without injury.

University of Wisconsin, Madison. *E. S. Goff.*

Three Questions.

To the Editor of Garden and Forest:

Sir.—I have made several attempts to transplant *Cornus florida*, but I have been unable to get my plants well through the first autumn, and after several attempts I have not one well established specimen. Are they difficult to transplant?

Will you kindly give me a complete list of evergreen trees and shrubs, not conifers, which will endure the winters of this region? Will any of the Magnolias, Andromedas or Rhododendrons endure a temperature which occasionally falls to thirty degrees below zero with bright sunshine following?

What perennial flowering plants are better planted in the fall in this latitude, forty-three north? Is this the best time to plant Pæonies?

Whitewater, Wis. *Albert Salisbury.*

[There is no particular difficulty in transplanting *Cornus florida*. As is the case with other trees, nursery-grown plants which have been frequently transplanted, and are therefore furnished with plenty of short fibrous rootlets, are more easily established than plants dug from the woods, which cannot be moved except at the sacrifice of a large part of their roots. For this reason it is always better, when practicable, to obtain plants from a good nursery, even although they are considerably more expensive, than it is to undertake to remove them from the woods.

There is probably no broad-leaved evergreen-tree capable of supporting the climate of Wisconsin and very few evergreen shrubs, whose cultivation there must be largely a matter of experiment. *Rhododendron maximum* grows naturally in a region where the thermometer sometimes falls to thirty degrees below zero, but, like the other plants of its family, it cannot be grown in soil impregnated with lime. The Inkberry, *Ilex glabra*, is an evergreen species which grows on the Atlantic coast as far north as Massachusetts, and it might be expected to endure the climate of Wisconsin. *Euonymus radicans*, a climbing evergreen species from Japan, is perfectly hardy in New England, and it should be tried, if it has not been already, in the north-western states. Probably none of the evergreen Andromedas would grow in Wisconsin, where, however, *Magnolia glauca*, which grows as far north on the Atlantic coast as the Inkberry, might be expected to succeed.

Nearly all strong-growing perennial plants can be divided and replanted in the autumn, but it should be done early enough to enable them to make new roots and become established before the ground freezes up. Probably the best time to transplant Pæonies at the north is early in September, as they start to grow so early, especially those having woody stems, that it is almost impossible to transplant them in the spring before growth commences.—Ed.]

Recent Publications.

Two Years in the French West Indies, by Lafcadio Hearn (Harper & Brothers, New York, 1890), contains a number of sketches of Martinique and of its interesting population, which bring before our eyes "Le Pays des Revenants" more accurately and pleasantly than anything which has yet been printed about the most picturesque of the Lesser Antilles.

A tropical forest is indescribable, perhaps, but one may get at least a vivid impression of it from the following sentences which Mr. Hearn has translated from the writings of Dr. Rufz, a Creole of Martinique, and which, as we read them, bring back to us the days we passed long ago in these forests, and all the strange and awful beauty which surrounded us:

"The sea, the sea alone, because it is the most colossal of earthly spectacles—only the sea can afford us any term of comparison for the attempt to describe a *grand-bois*—but even then one must imagine the sea on a day of storm suddenly immobilized in the expression of its mightiest fury. For the summits of these vast woods repeat all the inequalities of the land they cover; and these inequalities are mountains from 4,200 to 4,800 feet in height and valleys of corresponding profundity. All this is hidden, blended together, smoothed over by verdure, in soft and enormous undulations—in immense billowings of foliage. Only, instead of a blue line at the horizon, you have a green line; instead of flashings of blue, you have flashings of green—and in all the tints, in all the combinations of which green is capable: deep green, light green, yellow green, black green.

"When your eyes grow weary—if it indeed be possible for them to weary—of contemplating the exterior of these tremendous woods, try to penetrate a little into their interior. What an inextricable chaos it is! The sands of a sea are not more closely pressed together than the trees are here: some straight, some curved, some upright, some toppling—fallen, or leaning against one another, or heaped high upon each other. Climbing lianas, which cross from one tree to the other, like ropes passing from mast to mast, help to fill up all the gaps in this treillage; and parasites—not timid parasites like Ivy or like

moss, but parasites which are trees self-grafted upon trees—dominate the primitive trunks, overwhelm them, usurp the place of their foliage, and fall back to the ground, forming factitious Weeping-Willows. You do not find here, as in the great forests of the north, the eternal monotony of Birch and Fir: this is the kingdom of infinite variety—species the most diverse elbow each other, interlace, strangle and devour each other: all ranks and orders are confounded, as in a human mob. The soft and tender *Balisier* opens its parasol of leaves beside the *Gommier*, which is the Cedar of the colonies—you see the *Acomat*, the *Courbaril*, the Mahogany, the *Tendre-à-caillou*, the Ironwood . . . but as well enumerate by name all the soldiers of an army! Our Oak, the Balata, forces the Palm to lengthen itself prodigiously in order to get a few thin beams of sunlight; for it is as difficult here for the poor trees to obtain one glance from this king of the world as for us, subjects of a monarchy, to obtain one look from our monarch. As for the soil, it is needless to think of looking at it: it lies as far below us probably as the bottom of the sea—it disappeared ever so long ago, under the heaping of débris—under a sort of manure that has been accumulating there since the creation: you sink into it as into slime; you walk upon putrified trunks, in a dust that has no name! Here, indeed, it is that one can get some comprehension of what vegetable antiquity signifies—a lurid light (*lurida lux*), greenish, as wan at noon as the light of the moon at midnight, confuses forms and lends them a vague and fantastic aspect; a mephitic humidity exhales from all parts; an odor of death prevails, and a calm, which is not silence (for the ear fancies it can hear the great movement of composition and of decomposition perpetually going on), tends to inspire you with that old mysterious horror which the ancients felt in the primitive forests of Germany and of Gaul:

"'Arboribus suus horror inest.'"

The following description of the Botanic Garden at St. Pierre will be read with interest. It is the oldest garden in the West Indies, and certainly one of the most picturesque in situation; and although sadly neglected and overgrown, it contains many tropical trees which cannot be seen in any other garden in America to such advantage:

"The garden is less than a mile from the city, on the slopes of the Morne Parnasse; and the primitive forest itself has been utilized in the formation of it, so that the greater part of the garden is a primitive growth. Nature has accomplished here infinitely more than art of man (though such art has done much to lend the place its charm), and until within a very recent time the result might have been deemed, without exaggeration, one of the wonders of the world.

"A moment after passing the gate you are in twilight, though the sun may be blinding on the white road without. All about you is a green gloaming, up through which you see immense trunks rising. Follow the first path that slopes up on your left as you proceed, if you wish to obtain the best general view of the place in the shortest possible time. As you proceed, the garden on your right deepens more and more into a sort of ravine, on your left rises a sort of foliage-shrouded cliff; and all this in a beautiful crepuscular dimness, made by the foliage of great trees meeting overhead. Palms rooted a hundred feet below you hold their heads a hundred feet above you, yet they can barely reach the light. . . . Farther on the ravine widens to frame in two tiny lakes, dotted with artificial islands, which are miniatures of Martinique, Guadeloupe and Dominica; these are covered with tropical plants, many of which are total strangers even here; they are natives of India, Senegambia, Algeria and the most eastern east. Arborescent Ferns of unfamiliar elegance curve up from path-verge or lake-brink, and the great arbre-du-voyageur outspreads its colossal fan. Giant lianas droop over the way in loops and festoons; tapering green cords, which are creepers descending to take root, hang everywhere, and parasites with stems thick as cables coil about the trees like boas. Trunks shooting up out of sight, into the green wilderness above, display no bark; you cannot guess what sort of trees they are; they are so thickly wrapped in creepers as to seem pillars of leaves. Between you and the sky, where everything is fighting for sun, there is an almost unbroken vault of leaves, a cloudy green confusion, in which nothing particular is distinguishable!"

"It is of another century, this garden; special ordinances were passed concerning it during the French Revolution (An. II.); it is very quaint; it suggests an art spirit as old as Versailles or older; but it is indescribably beautiful even now.

". . . At last you near the end, to hear the roar of falling water; there is a break in the vault of green above the bed of a river below you, and at a sudden turn you come in sight of the cascade. Before you is the Morne itself, and against the burst of descending light you discern a precipice verge. Over it, down one green furrow in its brow, tumbles the rolling foam of a cataract, like falling smoke, to be caught below in a succession of moss-covered basins. The first clear leap of the water is nearly seventy feet. . . . Did Josephine ever rest upon that shadowed bench near by? . . . She knew all these paths by heart; surely they must have haunted her dreams in the after-time!"

"The beautiful garden is now little more than a wreck of what it once was; since the fall of the Empire it has been shamefully abused and neglected. Some agronome sent out to take charge of it by the Republic began its destruction by cutting down acres of enormous and magnificent trees—including a superb alley of Palms—for the purpose of experimenting with Roses. But the Rose-trees would not be cultivated there, and the serpents avenged the demolition by making the experiment garden unsafe to enter—they always swarm into underbrush and shrubbery after forest-trees have been cleared away. . . . Subsequently, the garden was greatly damaged by storms and torrential rains—the mountain river overflowed, carrying bridges away and demolishing stone work. No attempt was made to repair these destructions; but neglect alone would not have ruined the loveliness of the place—barbarism was necessary! Under the present negro-radical régime orders have been given for the wanton destruction of trees older than the colony itself; and marvels that could not be replaced in a hundred generations were cut down and converted into charcoal for the use of public institutions."

Part IX. of Forbes & Hemsley's *Enumeration of Chinese Plants*, published in the *Journal of the Linnæan Society*, has just appeared, and carries this valuable and important work through the *Plantagineæ*, and includes, besides that family, *Acanthaceæ*, *Verbenaceæ* and *Labiateæ*. Two new genera, Loxocalyx and Hancea, are proposed by Mr. Hemsley. The first is a herbaceous plant discovered by Henry in the Hupch district. It is remarkable in the elongated lower lip of the calyx, and in the very long stalk of the ovary, which is as long or longer than the ripe nutlets. Loxocalyx is placed provisionally near Otostegia and Roylea; a figure of the only species, *L. urticifolius*, is given. There is a figure, too, of *Hancea Sinensis*, the type of a genus detected by Faber on Mt. Omei, and which, Mr. Hemsley points out, resembles in habit, foliage and axillary racemose inflorescence the Japanese genus Keiskea, while in floral characters it approaches very nearly to Gomphostemma. The genus is dedicated to the memory of the late Dr. Hance, whose investigations into Chinese botany during a long residence at Hong-Kong are well known. The present part contains descriptions of a large number of new species, principally the discoveries of Henry and Faber.

Notes.

A train of ten cars loaded with Lima beans left Ventura County, California, for the east last week.

Mr. Charles Howard Shinn has been appointed Director of the Agricultural Experiment Station in California.

The *Bulletin d'Arboriculture* says that an excellent way to propagate *Hydrangea paniculata* is by means of flower-buds. These should be taken off with a heel when they root readily, and the method is especially useful if it is desired to force small plants quickly into flower for use in the house.

The *Gardeners' Magazine* makes mention of the fact that there is a white Vallota in existence. The stock is in the hands of Mr. Thomas S. Ware, of the Hale Farm Nurseries, Tottenham, London, England, who is preparing it for distribution. It will be a valuable addition to our garden plants if possessed of the good qualities which render *V. purpurea* so conspicuous.

A correspondent sends us some unusually fine fruits of the east Asian Orange, *Citrus trifoliata*, ripened in the open air in the Zoological Garden at Philadelphia. These plants, which are said to have been raised from seed collected in Palestine—of course, in a garden—have produced fruit for a number of years. They are in flower early in August, and the fruit is ripe two months later.

Le Moniteur D'Horticulture, quoting from *Le Journal des Campagnes*, describes the process used by French confectioners to reproduce artificially the flavor of strawberries in bonbons and ices. Chemistry, it seems, is able to imitate not only the taste but the perfume of the strawberry in all its delicacy by a combination of butyrate of ethyl, five parts; nitric ether, one part; formiate of ethyl, one part; acetate of ethyl,

four parts; salicylate of methyl, one part. The extract is said to be entirely harmless.

Mr. Sereno Watson continues his Contributions to American Botany, printed in the *Proceedings of the American Academy of Arts and Sciences*, No. 17 of the series having been issued on the 25th of September. It contains miscellaneous notes upon North American plants, with descriptions of a number of new species, and descriptions of new species from northern Mexico, collected principally by Mr. C. G. Pringle in 1888 and 1889. A number of new species and three new genera discovered by Mr. Pringle are here characterized.

The "Adirondack League Club," which owns 93,000 acres of forest-land, is at once to have its property carefully surveyed and inspected under the direction of Mr. B. E. Fernow, Chief of the Forestry Bureau of the Department of Agriculture at Washington, its desire being to preserve and administer its forests in the most scientific way. The example thus set to other owners of woodlands cannot be too highly approved. Nor has the aid of an expert in this special case been sought too soon, if it is true that the club has signed a contract to sell annually for the next fifteen years $30,000 worth of ripe Spruce timber.

The Manchurian representative of the Tartarian Maple (*Acer Tartaricum*, var. *Ginnala*) is not surpassed by any plant in the beauty of the coloring of its autumn foliage. The leaves appear earlier than those of the native Maples, with the exception of the Red Maple, and assume the most brilliant scarlet tints imaginable, retaining the color for a long time. This Maple has proved one of the most valuable of all small exotic trees for our northern gardens. It is very hardy; the habit is good, and the flowers, an unusual thing in flowers of the Maple, possess a delightful fragrance. It was introduced several years ago into the Arnold Arboretum from St. Petersburg. The largest plants in this country are now eighteen or twenty feet high, and flower and fruit regularly every year.

At a recent meeting of the Geographical Society of Germany, Chief Forest-master Kessler spoke strongly of the waste and recklessness to which the forests of the United States are falling a prey. Even now, as he pointed out, only eleven per cent. of the surface of this country is in forest, as against twenty-six per cent. of the surface of Germany. As our population increases the proportion of wood supply to our needs will, of course, rapidly diminish, but already the destruction of our woodlands menaces not only the revenues which might forever be derived from them, but also the fertility of the soil in many broad districts. It is encouraging to learn that Mr. Merritt, our Consul at Chemnitz, in Saxony, drew the attention of our Government to Herr Kessler's remarks in a recent official report.

In his "Year Among the Trees; or, Woods and By-ways of New England," published about ten years ago, Mr. Wilson Flagg says: "When I am journeying through the country and behold the rocky hills, sometimes for miles in extent, entirely bare of trees and affording too little sustenance to support even a crop of Whortleberry-bushes, where an acre would hardly pasture a single sheep, I am informed by the older inhabitants that these barren fields were since their childhood covered with forest. This wood cannot be restored, because the soil has been washed down from the surface to the plains below, and nothing remains to support a new growth of trees. And then I think, if our predecessors, instead of wrangling about theology, had left its mysteries to be explained by their pastors, and had studied some of the plain laws of meteorology, this devastation had not taken place." Even to-day, we may add, few persons realize that the laws of meteorology, as well as of forestry itself and of commercial conditions, insistently proclaim the necessity of forest-preservation.

Under the McKinley bill a duty of twenty per cent. ad valorem is now levied on "plants, trees, shrubs and vines of all kinds known as nursery-stock" imported into the United States. They were formerly admitted free. "Orchids, Lilies-of-the-Valley, Azaleas, Palms and other plants used for forcing under glass for cut flowers or decorative purposes" are still retained on the free list, and bulbs or bulbous roots not edible, on which a duty of twenty per cent. was levied under the old law, are now placed on the free list. Garden and agricultural seeds, and other seeds not specially provided for, with a few exceptions, still pay twenty per cent. ad valorem, although the following are on the free list: Anise, Canary, Caraway, Cardamom, Coriander, Cotton, Cummin, Fennel, Fenugreek, Hemp, Hoarhound, Mustard, Rape, St. John's Bread or Bean, Sugar-beet, Mangel-wurzel, Sorghum or Sugar-cane for seed, and all flower or grass seeds. These changes are likely to make a very considerable difference in the horticultural business of the country. The admission of bulbs of flowering plants free of duty should largely increase the importations of these plants and stimulate their cultivation in this country. The duty of twenty per cent. on so-called nursery-stock is likely to have unfortunate results. Some plants, like hardy Rhododendrons, hardy Azaleas, and certain conifers which require special climatic conditions and much skilled labor to produce to the best advantage, cannot be well grown in this country, and the duty must have the tendency of reducing the number of such plants used here. The retention of the duty on greenhouse plants, which, so far as their production goes, come under the same category as the plants already mentioned, is due to special efforts of the florists of the country. The duty will not affect, probably, the production of forest-tree seedlings in this country, and the only result will be to increase the cost to the planter. American nurserymen have already demonstrated their ability to produce better plants of this class at less cost than they can be imported for from any European country. The trade in Roses will probably be benefited by the duty, as it has been the habit of some Continental growers to glut this market yearly with their surplus and generally badly grown stock, which under forced auction sales has demoralized prices and made it difficult to find a market at fair prices for good plants grown in this country or in England.

An interesting bulletin from the Experiment Station of the Kansas State Agricultural College treats of *Experiments with Fungicides for Stinking-Smut of Wheat.* In many localities, in nearly every Wheat-growing country, the crop is more or less injured by this disease. It is not detected until the plants have headed out, and even then it is often overlooked. Before the grain ripens a careful examination shows that certain heads have a dark, bluish green color, while healthy plants present a lighter, yellowish green color. During and after ripening of the grain the smutted heads have a paler appearance than healthy ones. At no time do the smutted heads present the yellowish shade so characteristic of ripening Wheat. When the smutted heads are examined it is found that the grains have become dark and more or less swollen. They are at first of a greenish color, but become brownish or grayish when fully ripened. Because of their being usually swollen, the smutted grains push the chaff apart more than the sound kernels do, giving the head a slightly inflated appearance. If one of the swollen smutted grains be crushed it is found to be filled with a brownish powder which has a very disagreeable and penetrating odor. Often the disease is not discovered till the grain is threshed, when it is recognized by the odor from the smutted grains crushed by the machine. The smut may also be recognized during the milling, both from the odor arising during the grinding and by the dark streaks found in the flour. The dissemination of the disease is brought about by the use of smutted seed. The brown powder lodged in the threshing-machine may infect the seed, or the smut remaining in the field may, perhaps, through the soil, infect the succeeding crop. A summary of the results of the experiments at the Kansas Station, which were carried out by the botanists W. A. Kellerman and W. T. Swingle, shows that the stinking-smut of Wheat is caused by two closely allied parasitic Fungi called *Tilletia fœtens* and *Tilletia Tritici*; that these two species of smut differ only in a few microscopic characters, and both produce the same disease, which is spread by spores adhering to the sound grains before they are planted, or, perhaps, rarely by spores present in the soil; that the damage from this disease is often very considerable, sometimes amounting to from one-half to three-quarters of the whole crop; that in ordinary cases the disease can be entirely prevented by soaking the seed fifteen minutes in water heated to 132° F.; that the other fungicides used, when decreasing the amount of smut, at the same time also interfered with the germination, and reduced the vigor of the plants, and that seed from clean fields (if the adjoining fields were not smutty) will produce a crop of Wheat free from smut.

Catalogues Received.

Glenn & Drake, Columbus, Ind.; Fruit and Flower Seeds and Bulbs.—Haage & Schmidt, Erfurt, Germany; Novelties of Seeds and Bulbs.—Fred. W. Kelsey, 145 Broadway, New York; Trees, Shrubs, Roses, Bulbs and Hardy Plants.—Spring City Nurseries Company, Huntsville, Ala.; Fruit and Ornamental Trees.—Samuel C. Moon, Morrisville Pa.; Ornamental Trees and Plants, Fruits, etc.—Schlegel & Fottler, 26 South Market Street, Boston, Mass.; Seeds, Bulbs, Roots, etc.—Jas. M. Thorburn & Co., Fruit, Vegetable and Flower Seeds.—Thos. S. Ware, Tottenham, London, England; Tree and Herbaceous Pæonies.